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(54) [TITLE OF THE INVENTION]

Chair with Reclining Apparatus

(57) Abstract

[Purpose]: It is made such that even if it is installed in an interval similar to the conventional one and even if the reclining angle is made larger, the head rest does not move toward the back and no inconvenience is caused for the back seat.

[Configuration]: The lower end of a chair back 8 is attached in a pivoting manner to the rear portion of a seat portion 3 that is able to slide on a floor surface 1 and a slide unit 2, an expansion and contraction means 11 supported by the slide unit 2 is attached at the centre portion of said chair back 8, one end of a link 12 supported near that attachment is supported by the slide unit 2 side, and during reclining the position of the head rest 13 hardly moves at all in the forward and back directions.

[See source for drawing]

[Scope of Utility Model Registration Claims]**[Claim 1]**

A chair with a reclining apparatus characterized in that it is equipped with a guidance means that is able to guide the seat portion of a base unit, floor, etc., forward and back, a chair back that is supported by the rear portion of the seat portion that is able to move on said guidance means, an expansion and contraction means such as a cylinder that is provided between said chair back and said guidance means so that expansion and contraction are possible, and a link whose one end is supported by said guidance means and whose other end is supported by the chair back and that tilts the chair back to face upward while moving it forward when said expansion and contraction means contracts.

[Brief Explanation of the Drawings]**[Fig. 1]**

Fig. 1 is a side view drawing of an embodiment that shows the reclining status and the chair back raised status of the present device.

[Fig. 2]

Fig. 2 is an oblique view of the chair back raised status of the above.

[Fig. 3]

Fig. 3 is an oblique view of the reclining status of the above.

[Explanation of codes]

- 1 Floor surface
- 2 Slide unit
- 3 Seat portion
- 8 Chair back
- 9 Expansion and contraction means
- 12 Link
- 17 Handle
- 18 Wire

[Fig. 1]**[Fig. 2]****[Fig. 3]**

[Detailed Description of the Device]

[0001]

[Industrial Field of Application]

The present device relates to a chair with a reclining apparatus that is mainly built into transportation means such as vehicles and vessels, which can be sat upon and changed to a raised posture in which the chair back is raised or a reclining posture in which the posture is such that one is partly lying back facing upward, and in particular, which is installed in limited spaces such as said transportation machines.

[0002]

[Prior Art]

In chairs with reclining apparatuses that are mainly used in transportation means such as vehicles and vessels, the chair back is attached so that it is able to turn downward toward the back with the vicinity of the back end of a secured seat portion as a fulcrum, and by releasing the catch of that downward turning, the chair back can be turned down to the desired angle, and in rare cases there are also those in which the seat portion slides forward when the chair back turns downward.

[0003]

[Problems to be Solved by the Device]

The aforementioned type of chair with a reclining apparatus is such that the seat portion is secured in the aforementioned way, and only the chair back portion is turned downward toward the back, so when this reclining has been performed, the interval between the front end of that seat and the back end of the seat in front does not change, so the person that has performed reclining is not restricted at all.

[0004]

In contrast with this, when reclining is performed, the head position moves considerably backward when that downward turning angle is large, and, regardless of the fact that no lack of freedom is felt at all in that seat in the aforementioned way, the person in the back seat feels the effects and comes to feel lack of freedom of movement, and the space in front of and behind the seat must be widened in order for the person sitting in the back seat to freely engage in various actions including sitting down on the seat portion and rising up.

[0005]

For this reason, chairs with reclining apparatuses in which the aforementioned front and rear intervals are large and that require a wide space are not appropriate in narrow spaces such as, vehicles, vessels, etc., and therefore, they have not been able to avoid inconveniencing other people.

[0006]

In addition, chairs with reclining apparatuses in which the seat portion slides forward in the aforementioned turning down of the chair back have a drawback in that it is difficult to completely lock the forward and back movement and the seat slips, and for these reasons, it has not been possible to make chairs with reclining mechanisms in which the inclination angle of reclining is large, that is, in which the stroke is large.

[0007]

The purpose of the present device is to solve the aforementioned problems of the conventional chair with a reclining apparatus and to provide a chair with a reclining apparatus that does not inconvenience the person in the seat behind even if the angle of downward turning of the chair back is made large in reclining and that is able to reduce the amount that the seat interval is widened compared to the conventional case.

[0008]

[Means to Solve Problems]

The present device relates to a means of a chair with a reclining apparatus for achieving the above purpose, and that means is characterized in that it is equipped with a guidance means that is able to guide the seat portion of a base unit, floor, etc., forward and back, a chair back that is supported by the rear portion of the seat portion that is able to move on said guidance means, an expansion and contraction means such as a cylinder that is provided between said chair back and said guidance means so that expansion and contraction are possible, and a link whose one end is supported by said guidance means and whose other end is supported by the chair back and that tilts the chair back to face upward while moving it forward when said expansion and contraction means contracts.

[0009]

[Action]

The chair with a reclining apparatus of the present device is such that while the portion that is close to the head portion of chair back descends as-is during contraction of the expansion and contraction means, the seat portion moves forward on a guidance means by means of the link supported by the guidance means, and the centre portion of the chair back is pushed forward and goes into a turned down status, and reclining is performed.

[0010]

[Embodiment]

Next an example of embodiment of the present device will be given while referring to Fig. 1 through Fig. 3. 1 is the floor surface of the vehicle, etc., 2 is a slide unit 2 that has a built in heating apparatus, etc., and that is secured to the floor surface 1, and a pair of guides 2a in the shape of a square letter C are secured to this slide unit 2.

[0011]

3 is the seat portion, 4 is a wheel that slides on the floor surface 1 and is attached via a support column 5 to the front lower surface of the aforementioned seat portion 3, 6 is a slide plate that is secured to the left and right side surfaces of the seat portion 3, and they are configured so that a roller 6a that is attached to the back end moves within the aforementioned guide.

[0012]

7 is a stay that is attached to the back of the left and right side surfaces of the seat portion 3, 8 is the chair back, 9 is an arm that is attached to the bottom of the left and right side portions of the aforementioned chair back 8, and it is supported so that it is able to rotate with the aforementioned stay via a connecting plate 10.

[0013]

11 is an expansion and contraction means such as an air cylinder whose lower end is rotatably attached to the rear centre portion of the aforementioned slide unit 2 and whose upper end is rotatably attached to the back surface centre portion of the aforementioned chair back 8, and 12 is a link whose lower end is rotatably attached to a bracket 2b that is secured to the slide unit 2 and whose upper end is rotatably attached to the side surface centre portion of the chair back 8.

[0014]

13 is a head rest that is attached to the upper end of the chair back 8 and is able to move up, down forward and back, 14 is a foot rest that is attached to the lower surface of the seat portion 3 so that it can be freely moved in and out, and a wheel 14 [sic; 4] that is able to move forward and back on the floor surface 1 is secured to the lower surface via a support column 15. In addition, it is such that, by sliding the wheel 14 [sic] on the floor surface 1, it is possible to store the footrest 14 beneath the seat portion 3 and to pull it out to the front.

[0015]

17 is a handle that is attached to the front of the side surface of the seat portion 3, and one end of a flexible wire 18 is connected to its lower end. In addition, the other end of this wire 18 is connected to a lock means 11a for locking the expansion and contraction of the aforementioned expansion and contraction means.

[0016]

In a normal status, as shown by the solid lines in Fig. 1, this chair with a reclining apparatus, is such that the chair back 8 is in a raised status, but when one is to recline, when the handle 17 is pulled forward, the lock means 11a is pulled by means of the wire 18a, and expansion of the expansion and contraction means 11 goes into a free status.

[0017]

Therefore, if this is caused to slide forward in a status in which one is seated on the seat portion 3, the roller 6a of the slide plate 6 moves within the guide 2a. In this movement, the chair back 8 is also supported by a link 12, so the link 12 rotates with the lower end as a fulcrum. Therefore, while compressing so that the expansion and contraction means 11 goes into a contracted status, the attachment point of the expansion and contraction means 11 of the chair back 8 moves in the forward downward direction.

[0018]

For this reason, the chair back 8 is such that as tilting in the upward facing direction is performed so that descending is caused with the position of the head rest 13 thereof hardly moving at all in the forward

and back directions, movement of the seat portion 3 to the front is performed, and the reclining status shown by the alternate long and two short dashes line in Fig. 1 results.

[0019]

In this way, if the handle 17 is pulled when in the reclining status, the expansion and contraction means 11 goes into a free status, so an action that is the opposite of the aforementioned action results due to the sliding of the seat portion 3 backward, and as the link 12 is raised and the chair back 8 goes into the raised status, the seat portion 3 also moves backwards, and there is a return to the initial raised status of the chair back 8.

[0020]

In addition, by returning the handle 17 and locking the locking means 11a after the amount of sliding of the seat portion 3 is adjusted while pulling the handle 17 in the aforementioned way, adjustment of the reclining angle is performed. Note that the foot rest 16 is positioned in front of the seat portion 3 shown by the alternate long and two short dashes line by manually pulling it, and it is possible to put one's feet up and rest while reclining, and, also, it can be stored beneath the seat portion 3 and will not be an obstruction when the chair back 8 is raised.

[0021]

Note that the code 19 in the figure is an arm rest whose front end is attached to the seat portion 3 and whose back end is attached to the chair back 8, and depending on the vehicle, location, etc., where it is to be installed, the chair with a reclining apparatus can be appropriately changed according to the installation status thereof such as, by omitting the arm rest 19 and the foot rest 16.

[0022]

In addition, the chair with a reclining apparatus of the present device may be made such that locking and unlocking of the aforementioned expansion and contraction means is performed by a solenoid valve that is operated by the handle 17 or by a solenoid valve that is operated by a push-button switch attached to the arm rest.

[0023]

In addition, in the aforementioned example of embodiment, the explanation was for one in which the lower end of the expansion and contraction means 11 is attached to the slide unit 2, but the same operation as that noted above is performed even if the lower end of the expansion and contraction means 11 is attached to an axle (not shown in the drawing) that connects the left and right rollers 6a that move within the guide 6 and movement is performed in conjunction with the movement of the seat portion 3.

[0024]

[Effects of the Device]

As described above, the present device is such that the chair back is supported by a link in addition to being supported by a cylinder than is able to expand and contract, and, during contraction of the cylinder, reclining is performed with the head portion of the chair back moving hardly at all in the forward and back directions with the rotation of the link, and the seat portion moves forward by a corresponding amount, so, during reclining, the knee portion of the seat behind no longer becomes narrower during reclining, and no inconvenience is caused to the person in the seat behind.

[0025]

In this way, there are effects such that no inconvenience is caused to the seat behind, so it is possible to maintain the intervals of the seat in the front and behind that are similar to the conventional intervals, and comfortable reclining can be performed without causing a reduction in the number of seats in locations in which installation space is limited, such as vehicles and vessels.